Note

Clarification of the distribution of the Long-eared Horseshoe Bat *Rhinolophus philippinensis* complex in Australia

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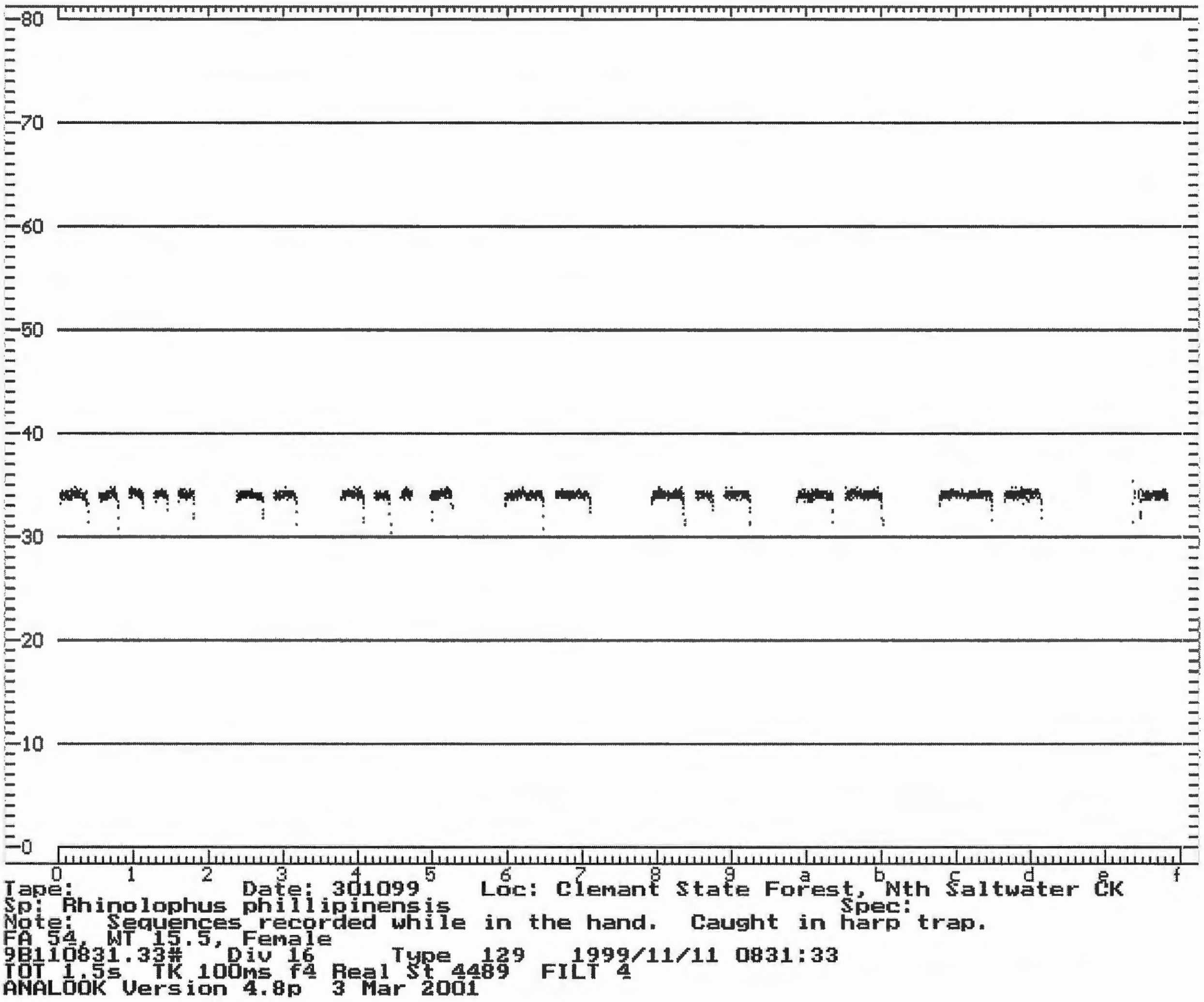
The Large-eared Horseshoe Bat *Rhinolophus philippinensis* occurs in a broad strip of coastal and near-coastal habitat in north-eastern Queensland. Two forms are currently recognised: large/greater and small/lesser. However, their taxonomic status and distribution are poorly defined (Churchill 1998). Both forms are genetically extremely similar raising the possibility that the smaller form is a hybrid between *R. philippinensis* and *R. megaphyllus*, a smaller species with a less complex nose-leaf, distributed across the entire eastern coast of Australia (Cooper *et al.* 1998). The two forms of *R. philippinensis* also exhibit morphological overlap with the more widespread larger form exhibiting clinal variation that trends smaller, from north to south (Thomson *et al.* 2001). Both *R. philippinensis* forms are considered to be of conservation significance: the large form is endangered (EPBC 1999; Duncan *et al.* 1999); the small form is data deficient (Duncan *et al.* 1999); and the general species complex is rare (Queensland Government 1997).

A number of recent publications report on the distribution of the two species, and provide conflicting distribution and morphometric data. Firstly, Churchill (1998) transposes the distribution maps, and call frequency for both the large and small forms described, creating confusion. The data should correctly read, the large form *R. philippinensis* (forearm 52-59 mm, ear length 29.0-33.3 mm, weight 10.1-16.2 g, CF call frequency 28-32 kHz) as occurring from Iron Range to Townsville, and the small form *R. philippinensis* (forearm 50-53.5 mm, ear length 25.3-27.3 mm, weight 8.3-9.9 g, call frequency 40 kHz) occurring from Iron Range to the McIlwraith on Cape York. Pavey (1995) also transposes the call frequencies, as the smaller form has a call frequency of 40 kHz, and the larger form 28-32 kHz. Three other publications list the correct morphological statistics for the two *R. philippinensis* forms, though are conservative in their identification of the distributions. Cooper *et al.* (1998) and Thomson *et al.* (2002) identify the large form occurring from approximately Iron Range south to Mt Surprise/Broken River Karst, west of Ingham, and small form as occurring from approximately Coen/ McIlwraith Range north to the top of Cape York Peninsula. Similarly, Duncan *et al.* (1999) identify the distribution as large form occurring from Malanda (Curtain Fig State Forest) to Iron Range and west to Chillagoe, and the small form also between the McIlwraith and Iron Ranges on Cape York.

This note reports two records of the *R. philippinensis* complex obtained opportunistically during larger standardised fauna surveys (see methods description in Kutt 2004). The first was trapped on 27 June 1996 in a mist-net on Keelbottom Creek, at the Department of Defence Townsville Field Training Area (19°18’21’S, 146°12’09”E), 50 km west of Townsville. This individual was male with a forearm of 53.5 mm and weight of 12.4 g. This places the species within the morphological range of the large form, though no ear measurements were taken. The habitat was tall riparian forest (*Melaleuca leucadendra*, *Eucalyptus tereticornis*, *E. tessellaris*) within a mosaic of open grassy woodlands. The region is dotted with caves, rock outcrops and old mines, and was approximately 10 km from closed forests of the Bluewater Range State Forest. Another individual of *R. philippinensis* was recorded from an earlier survey of the training area (Williams *et al.* 1993). This bat was trapped on 7 September 1991 in a mist-net set under a bridge (19°26’S, 146°32’E), though measurements were not recorded (S. Williams, pers. comm., James Cook University, 2000).

The second was trapped on 29 October 1999 in a harp trap on Saltwater Creek in Clemant State Forest (19°06’30”S, 146°24’54”E), 40 km north of Townsville. This individual was a female with forearm of 54 mm and a weight of 15.5 g. Again this places the species within the range of the large form, though again no ear measurements were taken. The habitat was closed riparian forest, running through tall open White Mahogany *E. acmenoides* woodland. The riparian area was at the base of Bluewater Range on the eastern side, and these rocky drainage lines are dotted with rock crevices, overhangs and caves. Echolocation sequences were recorded in the hand with an Anabat detector (Titley Electronics) direct to tape and calibrated. Calls were a constant frequency of 34 kHz (Figure 1), tantalisingly intermediate to the reported range for the large and small form of the species. Geographic variation in echolocation calls of other bat species is known (Law *et al.* 2002). Furthermore the large form of *R. philippinensis* clines smaller in size, at the southern end of its distribution (Cooper *et al.* 1998). This body size variation may correspond to an increasing echolocation frequency, as there appears to be a general relationship between microchiropteran body sizes and call frequency (Feng *et al.* 2002). As such there may be an inverse echolocation/ morphology cline for the large form of *R. philippinensis* as one moves from north to south in its distribution.



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Tape:            Date: 301099    Loc: Clemant State Forest, Nth Saltwater CK
Sp: Rhinolophus phillipinensis                           Spec:
Note:  Sequences recorded while in the hand.  Caught in harp trap.
FA 54, WT 15.5, Female
9B110831.33#    Div 16      Type  129    1999/11/11 0831:33
TOT 1.5s  TK 100ms f4 Real St 4489  FILT 4
ANALOOK Version 4.8p  3 Mar 2001
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Figure 1. *Rhinolophus philippinensis* echolocation sequence recorded in the hand (direct to tape and calibrated) using an Anabat detector from an animal captured at Clemant State Forest, 40km north of Townsville.

These records re-confirm that the *R. philippinensis* complex occurs south to Townsville, and reiterates that the larger form has the southern-most distribution. These data do not and cannot provide any definitive information regarding taxonomic identity. It is possible that the species occurs even further south than those localities reported here, to areas surrounding Mt Elliott National Park (a Wet Tropics Bioregion outlier) or even Cape Cleveland National Park, an area of granite massifs, vine thicket, open woodlands. Further survey would be needed to confirm these contentions.

The records here identify a common dilemma where opportunistic captures of significant records can remain hidden from the public arena. Despite their perceived intellectual blandness, brief notes regarding distribution are extremely important data sources for threatened species management. There is also argument that significant specimens such as these should be collected as vouchers for further taxonomic work, which would also aid in rectifying simple mistakes in reporting such as those detailed above. The reported morphology of the two *R. philippinensis* forms also indicates that there is a high degree of overlap in forearm length and weight. Conversely the ear-length seems to be a significant diagnostic feature with no overlap and should be routinely measured and used in identification of potential species difference. Accurate distribution data are a primary step when developing recovery priorities, and assessment of presence in protected areas is a specific objective of many recovery plans (Thomson *et al.* 2002).

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